NOTICE OF REVISION (NOR)

(See MIL-STD-480 for instructions)
This revision described below has been authorized for the document listed.

DATE (YYMMDD)	Form Approved OMB No. 0704-0188
93-04-01	

1. ORIGINATOR NAME AND ADDRESS	2. CAGE CODE	3. NOR NO.
Defense Electronics Supply Center Dayton, Ohio 45444-5270	67268	5962-R107-93
	4. CAGE CODE 67268	5. DOCUMENT NO. 5962-87508

6. TITLE OF DOCUMENT	7. REVISION LETTER	
MICROCIRCUIT, DIGITAL, ECL, ECL-TO-TTL TRANSLATOR, MONOLITHIC SILICON	A (Current)	B (New)
	8. ECP NO. N/A	

9. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES

ALL

10. DESCRIPTION OF REVISION

Sheet 1: Revisions ltr column; add "B".
Revisions description column; add "Changes in accordance with NOR 5962-R107-93".
Revisions date column; add "93-04-01".
Change title of document as shown above in block 6.
Revision level block; change from "A" to "B".
Revision status of sheets; for sheets 1, 4, 5, 6, and 7; change from "A" to "B".

Sheets 4, 5, and 6: Table I, power supply drain current, I_{EE}; add "4/" in symbol column.
Revision level block; change from "A" to "B".

Sheet 5: Table I, high level threshold output voltage, V_{OHA}; change V_{IL} for subgroup 3 from "-1.510 V" to "-1.514 V".

Sheet 7: Table I, add footnote 4/ as follows: "The I_{EE} limits, although specified in the minimum column, shall not be exceeded, in magnitude, as a maximum value."
Revision level block; change from "A" to "B".

11. THIS SECTION FOR GOVERNMENT USE ONLY

a. CHECK ONE

[X] EXISTING DOCUMENT SUPPLEMENTED BY THIS NOR MAY BE USED IN MANUFACTURE.

[ ] REVISED DOCUMENT MUST BE RECEIVED BEFORE MANUFACTURER MAY INCORPORATE THIS CHANGE.

[ ] CUSTODIAN OF MASTER DOCUMENT SHALL MAKE ABOVE REVISION AND FURNISH REVISED DOCUMENT TO:

b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT	SIGNATURE AND TITLE	DATE (YYMMDD)
DESC-ECC	Monica L. Poelking Chief, Custom Microelectronics	93-04-01
12. ACTIVITY ACCOMPLISHING REVISION	REVISION COMPLETED (Signature)	DATE (YYMMDD)
DESC-ECC	Larry T. Gauder	93-04-01

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Made technical changes to table I. Figure 4 added. Editorial changes throughout.	92-01-27	Monica Poelking

REV																				
SHEET																				
REV																				
SHEET																				

REV STATUS OF SHEETS															
REV	A	A	A	A	A	A	A	A			A	A	A		
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13		

PMIC N/A

STANDARDIZED MILITARY DRAWING

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

PREPARED BY
David W. Queenan

CHECKED BY
D. A. DiCenzo

APPROVED BY
Robert P. Evans

DRAWING APPROVAL DATE
29 JANUARY 1988

REVISION LEVEL
A

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, DIGITAL, ECL-TO-TTL TRANSLATOR, MONOLITHIC SILICON

SIZE	CAGE CODE	5962-87508
A	67268	

SHEET 1 OF 13

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part or Identifying Number(PIN). The complete PIN shall be as shown in the following example:

5962-87508	01	E	X
Drawing number	Device type (see 1.2.1)	Case outline (see 1.2.2)	Lead finish per MIL-M-38510

1.2.1 Device type(s). The device type(s) shall identify the circuit function as follows:

Device type	Generic number	Circuit function
01	10H525	Quad ECL-to-TTL translator

1.2.2 Case outline(s). The case outline(s) shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letter	Case outline
E	D-2 (16-lead, .840" x .310" x .200"), dual-in-line package
F	F-5 (16-lead, .440" x .285" x .085"), flat package
2	C-2 (20-terminal, .358" x .358" x .100"), square chip carrier package

1.3 Absolute maximum ratings.

Supply voltage range	-8.0 V dc to 0.0 V dc
Input voltage range	0.0 V dc to -5.46 V dc
Storage temperature range	-65° C to +165° C
Lead temperature (soldering, 10 seconds)	+300° C
Junction temperature (T_J)	+165° C
Maximum power dissipation (P_D)	255 mW
Thermal resistance, junction-to-case (Θ_{JC})	See MIL-M-38510, appendix C

1.4 Recommended operating conditions.

Supply voltage (V_{EE})	-5.46 V dc minimum to -4.94 V dc maximum
Case operating temperature range (T_C)	-55° C to +125° C
Minimum high level input voltage (V_{IH}):	
T_A = +25° C	-0.780 V
T_A = +125° C	-0.650 V
T_A = -55° C	-0.840 V
Maximum low-level input voltage (V_{IL})	-1.950 V

2. APPLICABLE DOCUMENTS

2.1 Government specification, standard, and bulletin. Unless otherwise specified, the following specification, standard, and bulletin of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

BULLETIN

MILITARY

MIL-BUL-103 - List of Standardized Military Drawing (SMD's).

(Copies of the specification, standard, and bulletin required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.2 herein.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.3 Truth table. The truth table shall be as specified on figure 2.

3.2.4 Logic diagram. The logic diagram shall be as specified on figure 3.

3.2.5 Test circuit and switching waveforms. The test circuit and switching waveform shall be as specified on figure 4.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full ambient operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_A \le +125°C$ Unless otherwise specified	V_{IH}	V_{IL}	Group A subgroups	Limits Min	Limits Max	Unit
Cases E, F, and 2	Quiescent tests 1/							
High level output voltage	V_{OH}	V_{EE} = -5.2 V 2/ V_{CC} = +5.0 V Load = -2 mA GND = 0.0 V	-0.780	-1.950	1	2.500		V
			-0.650	-1.950	2	2.500		
			-0.840	-1.950	3	2.500		
Low level output voltage	V_{OL}		-0.780	-1.950	1		0.500	V
			-0.650	-1.950	2		0.500	
			-0.840	-1.950	3		0.500	
High level threshold output voltage	V_{OHA}		-1.110	-1.480	1	2.500		V
			-0.960	-1.465	2	2.500		
			-1.160	-1.510	3	2.500		
Low level threshold output voltage	V_{OLA}		-1.110	-1.480	1		0.500	V
			-0.960	-1.465	2		0.500	
			-1.160	-1.510	3		0.500	
Power supply drain current	I_{EE}	GND = 0.0 V V_{EE} = -5.46 V V_{CC} = +5.0 V			1	-40		mA
					2,3	-44		
High level input current	I_{IH}	V_{IH} = -0.780 V at +25°C -0.650 V at +125°C -0.840 V at -55°C			1		145	µA
					2,3		225	
Short circuit output current	I_{OS}	GND = 0.0 V V_{EE} = -5.46 V, V_{OUT} = 0.0 V V_{IL} = -1.950 V V_{CC} = +5.0 V			1,3	-150	-60	mA
					2	-150	-60	
Reference bias supply voltage	V_{BB}	V_{EE} = -5.46 V V_{CC} = +5.0 V GND = 0.0 V			1	-1.37	-1.25	V
					2	-1.31	-1.19	
					3	-1.41	-1.27	
Low level output voltage	V_{OL2}	V_{EE} = -5.46 V All inputs = -5.46 V V_{CC} = +5.0 V GND = 0.0 V			1,3		0.5	V
					2		0.5	
Supply current high	I_{CCH}	V_{EE} = -5.2 V Inverting inputs = -0.780 V Inverting inputs = -0.650 V Inverting inputs = -0.840 V V_{CC} = +5.5 V GND = 0.0 V			1		63	mA
					2		63	
					3		63	
Supply current low	I_{CCL}	V_{EE} = -5.2 V Inverting inputs = -1.950 V V_{CC} = +5.5 V GND = 0.0 V			1,2,3		40	mA

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_A \le +125°C$ Unless otherwise specified	V_{IH}	V_{IL}	Group A subgroups	Limits Min	Limits Max	Unit
Cases E and F	Rapid tests 3/							
High level output voltage	V_{OH}	V_{EE} = -5.2 V 2/ V_{CC} = +5.0 V Load = -2 mA GND = 0.0 V	-0.791	-1.950	1	2.500		V
			-0.662	-1.950	2	2.500		
			-0.852	-1.950	3	2.500		
Low level output voltage	V_{OL}		-0.791	-1.950	1		0.500	V
			-0.662	-1.950	2		0.500	
			-0.852	-1.950	3		0.500	
High level threshold output voltage	V_{OHA}		-1.121	-1.484	1	2.500		V
			-0.972	-1.469	2	2.500		
			-1.172	-1.510	3	2.500		
Low level threshold output voltage	V_{OLA}		-1.121	-1.484	1		0.500	V
			-0.972	-1.469	2		0.500	
			-1.172	-1.514	3		0.500	
Power supply drain current	I_{EE}	GND = 0.0 V V_{EE} = -5.46 V V_{CC} = +5.0 V			1	-39		mA
					2,3	-43		
High level input current	I_{IH}	V_{IH} = -0.791 V at +25°C -0.662 V at +125°C -0.852 V at -55°C			1		130	µA
					2,3		210	
Short circuit output current	I_{OS}	V_{EE} = -5.46 V, V_{OUT} = 0.0 V V_{IL} = -1.950 V V_{CC} = +5.0 V GND = 0.0 V			1,3	-150	-60	mA
					2	-150	-60	
Reference bias supply voltage	V_{BB}	V_{EE} = -5.46 V V_{CC} = +5.0 V GND = 0.0 V			1	-1.380	-1.260	V
					2	-1.321	-1.201	
					3	-1.421	-1.280	
Low level output voltage	V_{OL2}	V_{EE} = -5.46 V All inputs = -5.46 V V_{CC} = +5.0 V GND = 0.0 V			1,3		0.5	V
					2		0.5	
Supply current high	I_{CCH}	V_{EE} = -5.2 V Inverting inputs = -0.791 V Inverting inputs = -0.662 V Inverting inputs = -0.852 V V_{CC} = +5.0 V GND = 0.0 V			1		63	mA
					2		63	
					3		63	
Supply current low	I_{CCL}	V_{EE} = -5.2 V Inverting inputs = -1.950 V V_{CC} = +5.0 V GND = 0.0 V			1,2,3		40	mA

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_A \le +125°C$ Unless otherwise specified			Group A subgroups	Limits Min	Limits Max	Unit
Case 2	Rapid tests 3/							
High level output voltage	V_{OH}	V_{EE} = -5.2 V 2/ V_{CC} = +5.0 V Load = -2 mA GND = 0.0 V	V_{IH} -0.797 -0.668 -0.858	V_{IL} -1.950 -1.950 -1.950	1 2 3	2.500 2.500 2.500		V
Low level output voltage	V_{OL}		-0.797 -0.668 -0.858	-1.950 -1.950 -1.950	1 2 3		0.500 0.500 0.500	V
High level threshold output voltage	V_{OHA}		-1.125 -0.977 -1.177	-1.485 -1.471 -1.516	1 2 3	2.500 2.500 2.500		V
Low level threshold output voltage	V_{OLA}		-1.125 -0.977 -1.177	-1.485 -1.471 -1.516	1 2 3		0.500 0.500 0.500	V
Power supply drain current	I_{EE}	GND = 0.0 V V_{EE} = -5.46 V V_{CC} = +5.0 V			1 2,3	-39 -43		mA
High level input current	I_{IH}	V_{IH} = -0.797 V at +25°C -0.668 V at +125°C -0.858 V at -55°C			1 2,3		130 210	µA
Short circuit output current	I_{OS}	V_{EE} = -5.46 V, V_{OUT} = 0.0 V V_{IL} = -1.950 V V_{CC} = +5.0 V GND = 0.0 V			1,3 2	-150 -150	-60 -60	mA
Reference bias supply voltage	V_{BB}	V_{EE} = -5.46 V V_{CC} = +5.0 V GND = 0.0 V			1 2 3	-1.380 -1.321 -1.421	-1.260 -1.201 -1.280	V
Low level output voltage	V_{OL2}	V_{EE} = -5.46 V All inputs = -5.46 V V_{CC} = +5.0 V GND = 0.0 V			1,3 2		0.5 0.5	V
Supply current high	I_{CCH}	V_{EE} = -5.2 V Inverting inputs = -0.797 V Inverting inputs = -0.668 V Inverting inputs = -0.858 V V_{CC} = +5.0 V GND = 0.0 V			1 2 3		63 63 63	mA
Supply current low	I_{CCL}	V_{EE} = -5.2 V Inverting inputs = -1.950 V V_{CC} = +5.0 V GND = 0.0 V			1,2,3		40	mA

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_A \le +125°C$ Unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Cases E, F, and 2	AC tests					
Transition time	t_{TLH}, t_{THL}	V_{EE} = -4.94 V V_{CC} = +5.0 V $C_L \le 5$ pF $R_L = 100\Omega$ GND = 0.0 V See figure 4	9 10 11	0.30 0.30 0.30	1.30 2.00 1.40	ns
Propagation delay time	t_{PLH}, t_{PHL}		9 10 11	0.85 0.90 0.80	3.20 3.50 2.90	ns

1/ The quiescent limits are determined after a device has reached thermal equilibrium. This is defined as the reading taken with the device in a socket with $\ge$ 500 LFPM of +25° C, +125° C or -55° C (as applicable) air blowing on the unit in a transverse direction with power applied for at least four (4) minutes before the reading is taken. This method was used for theoretical limit establishment only. All devices shall be tested to the delta V (rapid test) conditions specified herein. The rapid test method is an equivalent method of testing quiescent conditions.

2/ The high and low level output current varies with temperature and can be calculated using the following formula: $I_{OH} = (-2 V - V_{OH})/100\Omega$; $I_{OL} = (-2 V - V_{OL})/100\Omega$.

3/ The dc rapid test forcing functions and limits are used for all DC testing. These limits are determined for each device type based on the power dissipation and package type. The rapid test (delta V) limits and forcing functions are skewed allowing rapid testing to be performed at standard temperatures without the addition of Delta T's.

3.5 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in MIL-BUL-103 (see 6.6 herein).

3.6 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-BUL-103 (see 6.6 herein). The certificate of compliance submitted to DESC-ECC prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DESC-ECC shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.9 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

a. Burn-in test (method 1015 of MIL-STD-883).

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.6 herein).

(2) T_A = +125°C, minimum.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

a. Tests shall be as specified in table II herein.

b. Subgroups 4, 5, 6, and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroup 7 tests shall include verification of the truth table.

4.3.2 Groups C and D inspections.

a. End-point electrical parameters shall be as specified in table II herein.

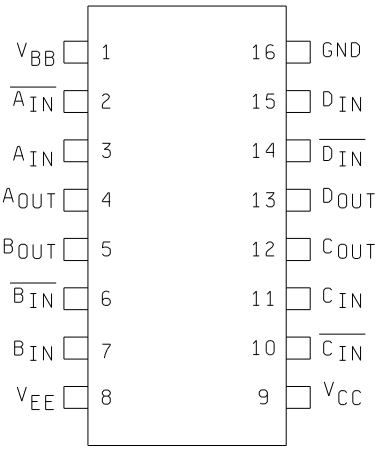
b. Steady-state life test (method 1005 of MIL-STD-883) conditions:

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.6 herein).

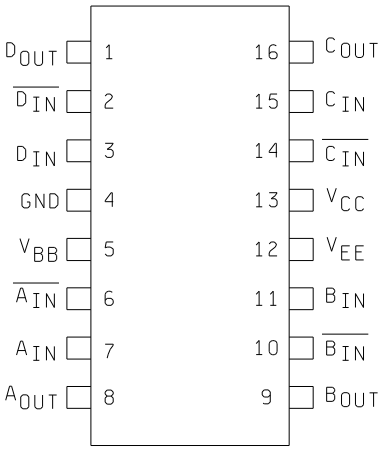
(2) T_A = +125°C, minimum.

(3) Test duration: 1,000 hours, except as permitted by appendix B of MIL-M-38510 and method 1005 of MIL-STD-883.

CASE E



CASE F



CASE 2

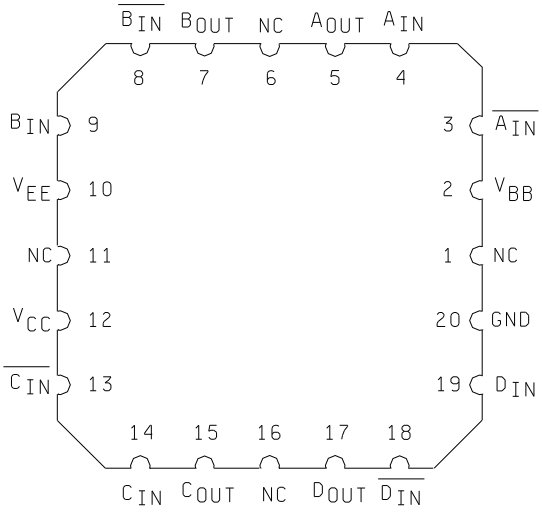


FIGURE 1. Terminal connections.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	**SIZE A**		**5962-87508**
		REVISION LEVEL	**SHEET 9**

Inputs		Output
Noninverting	Inverting	
L	H	L
H	L	H
L	L	*
H	H	*
Open	Open	L
V_{EE}	V_{EE}	L
L	V_{BB}	L
H	V_{BB}	H
V_{BB}	L	H
V_{BB}	H	L

L = low level voltage
H = High level voltage
* = Undetermined

FIGURE 2. Truth table.

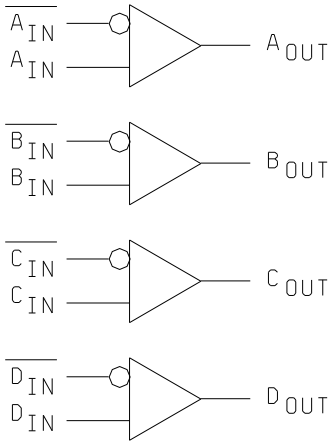


FIGURE 3. Logic diagram.

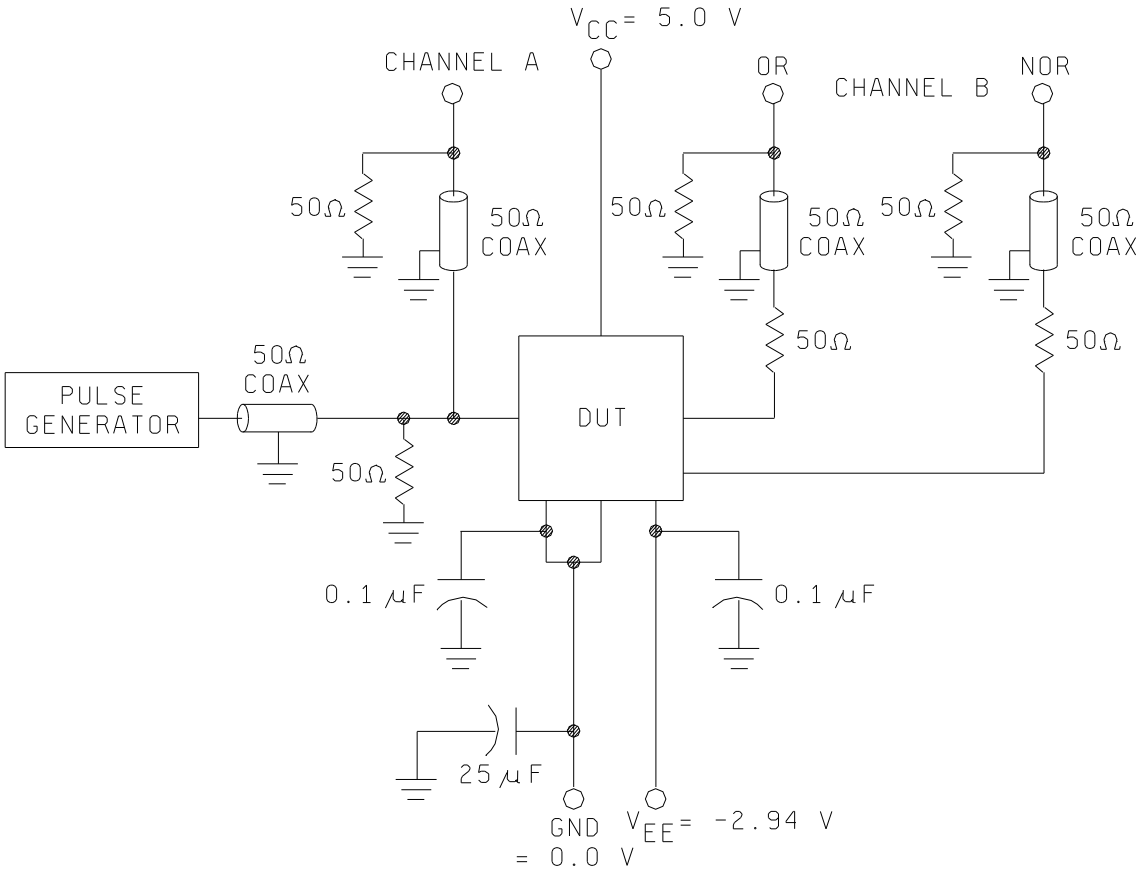
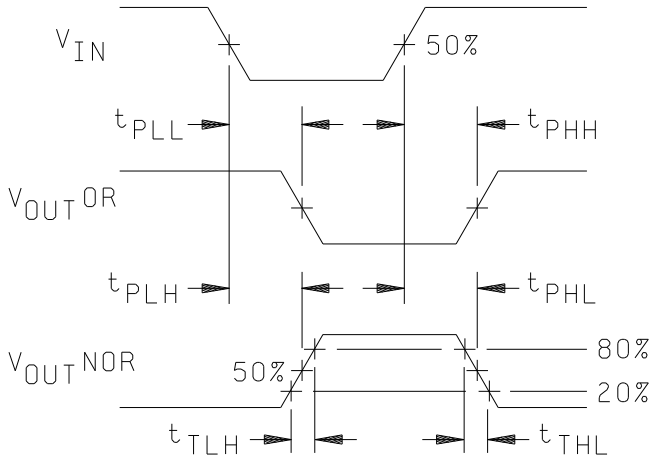


FIGURE 4. Test circuit and switching waveforms.



NOTES:

1. Pulse generator characteristics:
   P_{RR} = 1 MHz, t_{THL} = 1.0 ±0.2 ns (20 percent to 80 percent), duty cycle = 50 percent.
2. All other outputs are loaded through 100Ω to GND.
3. The 50Ω resistor in series with the 50Ω coaxial constitutes the 100Ω load.

FIGURE 4. Test circuit and switching waveform - Continued.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	1
Final electrical test parameters (method 5004)	1*, 2, 3, 7*, 9
Group A test requirements (method 5005)	1, 2, 3, 7, 9, 10, 11
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3

***PDA applies to subgroups 1 and 7.**

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-481 using DD Form 1693, Engineering Change Proposal (Short Form).

6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronics devices (FSC 5962) should contact DESC-ECC, telephone (513) 296-6022.

6.5 Comments. Comments on this drawing should be directed to DESC-ECC, Dayton, Ohio 45444, or telephone (513) 296-8525.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. The vendors listed in MIL-BUL-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DESC-ECC.

STANDARDIZED MILITARY DRAWING SOURCE APPROVAL BULLETIN

DATE:

Approved sources of supply for SMD 5962-87508 are listed below for immediate acquisition only and shall be added to MIL-BUL-103 during the next revision. MIL-BUL-103 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DESC-ECC. This bulletin is superseded by the next dated revision of MIL-BUL-103.

Standardized military drawing PIN	Vendor CAGE number	Vendor similar PIN 1/
5962-875081EX	04713	10H525/BEAJC
5962-8750801FX	04713	10H525/BFAJC
5962-87508012X	04713	10H525/B2AJC

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE number	Vendor name and address
04713	Motorola, Incorporated 5005 E. McDowell Road Phoenix, AZ 85008 Point of contact: 7402 South Price Road Tempe, AZ 85283